my laboratory by Dr. P. W. Hofmann. These two compounds stand in the same relation to each other as ethylamine and ethylene-diamine, as phenylamine and phenylene-diamine:

$$\text{Martylamine } \left.\begin{matrix} C_{12}H_9 \\ H \\ H \end{matrix}\right\} N; \quad \text{Benzidine-Martylene-diamine } \left.\begin{matrix} (C_{12}H_8)'' \\ H_2 \\ H_2 \end{matrix}\right\} N_2.$$

This is not merely a relationship existing on paper; whoever has had these compounds in his hand will at once recognize the necessity of placing them side by side; but I may be allowed to point more particularly to the remarkable similarity of the deportment of benzidine under the influence of iodide of ethyl, this base exhibiting the same reluctance to pass from the state of tertiary substitution to the state of ammonium base—a passage which, in the case of benzidine, exactly as in the case of martylamine, had to be accomplished by means of iodide of methyl.

II. "On the Form of Crystals of Peroxide of Benzoyl." By William Hallows Miller, M.A., For. Sec. R.S., Professor of Mineralogy in the University of Cambridge. Received December 18, 1862.

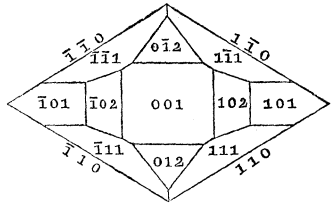
The peroxide of benzoyl, $C_{14}H_{10}O_4$, or carbon 69·42, hydrogen 4·13, oxygen 26·45, was discovered by Professor (now Sir B. C.) Brodie, and described by him in the 'Proceedings' of the Royal Society, vol. ix. p. 361. The crystals were obtained from a solution in ether of the product of the mutual decomposition of equivalent proportions of chloride of benzoyl and peroxide of barium mixed in water. The faces of the crystals, though brilliant, were not very even, so that, in order to obtain a moderately accurate result, it was necessary to measure a large number of crystals. The column headed 'observation' contains the means of the observed angles; the column headed 'calculation,' the most probable values of the angles, taking into account the quality of the faces containing them, and the number of the observations in each case.

System prismatic:—

$$1\,0\,1, 0\,0\,1 = 33^\circ\ 24'; \quad 1\,1\,0, 1\,0\,0 = 57^\circ\ 50'{\cdot}5.$$

Observed forms :—

0 1 0, 0 0 1, 0 1 2, 1 0 2, 1 0 1, 1 1 0, 1 1 1.



Angles.	Calculated.		Observed.	
	°	′	°	′
0 1 2, 0 $\bar{1}$ 2	55	21	55	20
1 0 1, $\bar{1}$ 0 1	66	48	66	49
1 0 2, $\bar{1}$ 0 2	36	30		
0 1 0, 0 0 1	90	0		
0 0 1, 1 1 0	90	0		
1 1 0, $\bar{1}$ 1 0	64	19	64	18
1 1 1, $\bar{1}$ 1 1	48	56		
1 1 1, 1 $\bar{1}$ 1	82	24		
1 1 1, 1 1 $\bar{1}$	77	49		
0 0 1, 1 1 1	51	5	51	3
1 1 1, 0 1 2	30	26		
1 0 1, 0 1 2	42	19		
1 0 1, 1 1 1	41	12		
1 1 0, 0 1 2	66	51		
1 1 0, 1 0 1	72	58		

No cleavage observable.

The minimum deviations of the brightest part of the solar spectrum were observed through the faces 0 1 2, 0 1 $\bar{2}$, through the faces 1 0 1, 1 0 $\bar{1}$, and through the faces 1 1 0, 1 $\bar{1}$ 0, the crystal being immersed in water contained in a vessel bounded by plates of glass parallel to the plane bisecting the dihedral angle formed by the refracting faces in each case. From these observations it appears that for a ray in the plane 1 0 0, and polarized in that plane, the index of refraction is about 1·837 ; for a ray in the plane 0 1 0, and polarized in that plane, the index of refraction is between 1·545 and 1·546 ; and for a ray in the plane 0 0 1, and polarized in that plane, the index of refraction is about 1·545. Hence the optic axes are in

the plane 0 1 0, and they make with each other a small angle which is bisected by the line [1 0 0].

A crystal having two opposite faces of the form 1 1 0 much larger than the two remaining faces, being immersed in oil for which $\mu = 1{\cdot}4793$, and placed in a polarizing apparatus, the rings surrounding the optic axes were seen through the large faces of the form 1 1 0. The angle included between the directions of the optic axes within the oil was about 4°.

III. "On the Synthesis of Leucic Acid." By Dr. Edward Frankland, F.R.S. Received December 26, 1862.

When oxalic ether is mixed with more than its own weight of zincethyl, the temperature of the mixture slowly rises, and soon considerable quantities of gas begin to be evolved, unless the heat be moderated by plunging the vessel, in which the reaction takes place, into cold water. The gas consists of equal volumes of ethylene and hydride of ethyl; and as it is the product of a secondary decomposition, its evolution should be avoided as much as possible in the manner just indicated. The final application of a gentle heat completes the reaction.

The mixture generally continues fluid, but it becomes of a light straw-colour, and of an oily consistency. On being heated to 130° C. in a retort, no distillate passes over. If, after cooling, its own volume of water be very gradually added to it, torrents of hydride of ethyl, derived from excess of zincethyl, are evolved. By subsequent distillation in a water-bath, weak alcohol containing an ethereal oil in solution passes over; and a further quantity of the oil may be obtained by adding water to the residue in the retort, and continuing the distillation upon a sand-bath. The ethereal oil was precipitated from the alcoholic distillate by the addition of water, and was added to that which floated upon the surface of the aqueous distillate. It was then dried over chloride of calcium, and rectified. A very large proportion of the liquid distilled between 174° and 176° C., and was collected apart.

Numerous analyses of this liquid agree closely with the formula*

$$C\ H_{16}\ O_3.$$

* C=12, O=16.